R E P O R T  R E S U M E S

ED 012 757 VT 000 464

A COMPARISON OF THE COLLEGE PERFORMANCE OF STUDENTS WHO DID AND THOSE WHO DID NOT STUDY VOCATIONAL AGRICULTURE IN GEORGIA HIGH SCHOOLS. VOCATIONAL EDUCATION IN AGRICULTURE, RESEARCH SERIES. (TITLE SUPPLIED)..

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REPORT NUMBER RES-SER-BULL-3 PUB DATE JUN 64
EDRS PRICE MF-$0.25 HC-$1.80 45P.

DESCRIPTORS- *VOCATIONAL AGRICULTURE, *COLLEGE STUDENTS, *GRADES (SCHOLASTIC), *HIGH SCHOOL GRADUATES, *COLLEGE ENTRANCE EXAMINATIONS, MALES, ABRAHAM BALDWIN AGRICULTURAL COLLEGE, GEORGIA, ATHENS

THE OBJECTIVE OF THIS STUDY WAS TO DETERMINE DIFFERENCES BETWEEN (1) MEAN COLLEGE FRESHMAN GRADES, (2) SPECIFIC COURSE GRADES, AND (3) COLLEGE ENTRANCE EXAMINATION BOARD SCORES FOR A GROUP OF FORMER VOCATIONAL AGRICULTURE STUDENTS AND A GROUP WITHOUT VOCATIONAL AGRICULTURE. THE STUDY POPULATION WAS LIMITED TO 148 MALE COLLEGE FRESHMEN AT ABRAHAM BALDWIN AGRICULTURAL COLLEGE DURING THE 1960-61 SCHOOL YEAR. ALL HAD GRADUATED FROM GEORGIA HIGH SCHOOLS. IT PARALLELED, IN OBJECTIVE AND METHODOLOGY, A STUDY CONDUCTED AT THE UNIVERSITY OF GEORGIA. DATA WERE FURNISHED BY THE COLLEGE REGISTRAR AND PROCESSED BY COMPUTER CENTER PERSONNEL, USING APPROPRIATE STATISTICAL TESTS OF SIGNIFICANCE. DIFFERENCES IN MEAN COLLEGE FRESHMAN GRADES WERE NOT SIGNIFICANT. COLLEGE ENTRANCE EXAMINATION BOARD SCORES SIGNIFICANTLY FAVORED THE NON-VOCATIONAL AGRICULTURE GROUP. SIGNIFICANT DIFFERENCES BETWEEN THE GRADES OF THE TWO GROUPS, FAVORING THE NON-VOCATIONAL AGRICULTURE GROUP, OCCURRED IN ENGLISH 101, AN ENGLISH COMPOSITE, AND MATHEMATICS. NO SIGNIFICANT DIFFERENCE WAS FOUND IN BOTANY, CHEMISTRY, ENGLISH 102, A COMPOSITE OF OTHER COURSES, OR A COMPOSITE OF ALL COURSES. THE VOCATIONAL AGRICULTURE GROUP SEEMED TO EARN HIGHER GRADES THAN WOULD BE EXPECTED WHEN USING THE COLLEGE ENTRANCE EXAMINATION AS A PREDICTOR OF SUCCESS. DIFFERENCES WITHIN THE VOCATIONAL AGRICULTURE GROUP WERE REPORTED. (JM)

ED012757

VOCATIONAL EDUCATION IN AGRICULTURE

Research Series June, 1964 Bulletin No. 3

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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# A Comparison of the College Performance of Students Who Did and Those Who Did Not Study Vocational Agriculture in Georgia High Schools in Terms of Grades Earned During Freshman Year of Study at Abraham Baldwin Agricultural College During 1960 - 1961 School Year

VT000464

The University of Georgia
College of Education
DEPARTMENT OF AGRICULTURAL EDUCATION
Athens, Georgia

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# A COMPARISON OF THE COLLEGE PERFORMANCE OF STUDENTS WHO DID AND THOSE WHO DID NOT STUDY VOCATIONAL AGRICULTURE IN GEORGIA HIGH SCHOOLS IN TERMS OF GRADES EARNED DURING FRESHMAN YEAR OF STUDY AT ABRAHAM BALDWIN AGRICULTURAL COLLEGE DURING 1960-61 SCHOOL YEAR

By G. L. O'Kelley, Jr., and H. T. Lester, Jr. [1]

As college admission standards have been revised upward in recent years, school administrators and counselors have tended increasingly to evaluate secondary school courses and curricula in terms of college preparatory values. As a result, questions are continually raised as to the effect of the study of high school vocational agriculture on students' subsequent college performance. The authors of this report made a rather careful study of the relative performance of former vocational agriculture and non-vocational agriculture students in the 1960-61 Freshman Class of the University of Georgia.[2] In view of the fact that a large number of Georgia high school graduates who intend to graduate from the University of Georgia complete the freshman and sophomore years of study at Abraham Baldwin Agricultural College prior to transferring to the University for the last two years of study, it was decided to make a comparable study of the 1960-61 Freshman Class at Abraham Baldwin Agricultural College. The tendency to complete two years of junior college work at Abraham Baldwin Agricultural College prior to enrolling at the University of Georgia is particularly pronounced in its College of Agriculture enrollment.

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[1]Professor and Assistant Professor, respectively, in Department of Agricultural Education, College of Education, University of Georgia.

[2]G. L. O'Kelley, Jr. and H. T. Lester, Jr., A Comparison of the College Performance of Students Who Did and Those Who Did Not Study Vocational Agriculture in Georgia High Schools in Terms of Grades Earned During Freshman Year of Study at the University of Georgia During 1960-61 School Year. Research Series, Department of Agricultural Education, University of Georgia, Bulletin No. 1, 1963.

## The Problem

The study was designed to compare the college performance of students who did and those who did not study vocational agriculture in Georgia high schools in terms of grades earned during the freshman year of study at Abraham Baldwin Agricultural College during the 1960-61 school year.

## The Specific Objectives

The specific objectives were as follows:

1. To determine if there was a significant difference between the mean grades earned during the freshman year by students who had studied vocational agriculture in high school and those who had not.

2. To determine if there was a significant difference between these two groups of students in terms of the distribution of letter grades on certain specified courses.

3. To determine if there was a significant difference between the College Entrance Examination Board scores[3] earned by these two groups of students.

4. To determine if there were significant differences between mean grades earned by students reporting one, two, three, or four units of high school vocational agriculture credit.

## Limitations

The study population was limited to male members of the Freshman Class enrolled in Abraham Baldwin Agricultural College during the 1960-61 school year who completed the three full quarters of study during that school year and who were graduates of Georgia high schools. All students meeting these criteria were included in the study population.

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[3] Hereafter referred to in this report as CEEB scores.

## Design of the Study

The study population was classified as to whether high school vocational agriculture credits were presented for admission to freshman status at the college. They were further classified as to the number of high school vocational agriculture units submitted by each student. Earned grades were determined for specific courses and a mean grade was calculated for all freshman courses for each student involved. Mean grades were calculated for the two study groups, differences were determined, and chi-square values were calculated to test significance of difference between groups in most of the comparisons made. In some comparisons t values were calculated by the sum of squares method for analysis of variance. CEEB scores, both verbal and mathematics, were determined for each student and group means were calculated as a basis for measuring variability, by use of t values, within groups due to factors which might affect the performance of students other than the grouping factor being studied.

## Plan of Procedure

The registrar of Abraham Baldwin Agricultural College was requested to furnish a list of all freshman students enrolled at the college during the year as well as the courses in which each enrolled and the grades earned. Reference to the official record made it possible to divide this group according to sex and the number of quarters of work completed during the year.

When the names listed were checked against matriculation records in the registrar's files, the students who had graduated from Georgia high schools were quickly identified. From the same source a listing was obtained of all high school units of credit submitted in meeting college entrance requirements. This listing also gave the number of high school vocational agriculture units reported. The registrar also made available a record of official CEEB scores for each student listed.

All data were coded and punched in IBM cards by personnel of the University of Georgia Computer Center. This same group processed all data, supplying tabulations and summaries in addition to all chi-square calculations requested. When t values were needed, these were computed by the researchers from the Computer Center tabulations.

Population Studied

There were 159 male members of the freshman class who entered Abraham Baldwin Agricultural College at the 1960 fall registration and who completed the three following consecutive quarters of study there. These figures are shown in Table 1. Initial limitations placed on this study resulted in an analysis being made of the records of only those male students who had graduated from Georgia high schools. There were 148 such students on record in the registrar's office. This study concerns these 148 students. Of this group, 93 students, or 62.8 percent, reported vocational agriculture credits on their high school transcripts at time of admission. The remaining 55 students, or 37.2 percent, reported no high school vocational agriculture credits. This division identifies the two study groups compared in this report. It is interesting to note that an even higher percentage, 72.7 percent, of the out-of-state male students in this class reported vocational agriculture credits on their transcripts, but these were not included in the study.

Of the 148 students reporting vocational agriculture credits the largest single group, 31.7 percent, reported 4 such units, while only 12.8 percent and 10.8 percent reported 3 and 2 such units, respectively. Only 7.4 percent reported one vocational agriculture unit of credit. See Table 2.

TABLE 1

ABRAHAM BALDWIN AGRICULTURAL COLLEGE FRESHMAN MALES CLASSIFIED AS GRADUATES OF IN-STATE OR OUT-OF-STATE HIGH SCHOOLS AND WHETHER OR NOT VOCATIONAL AGRICULTURE UNITS OF CREDIT WERE SUBMITTED FOR COLLEGE ADMISSION

| Classification | In-state students | | Out-of-state students | | All students | |
|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent |
| With vocational agriculture | 93 | 62.84 | 8 | 72.73 | 101 | 63.52 |
| Without vocational agriculture | 55 | 37.16 | 3 | 27.27 | 58 | 36.48 |
| Totals | 148 | 100.00 | 11 | 100.00 | 159 | 100.00 |

TABLE 2

STUDY POPULATION CLASSIFIED ACCORDING TO NUMBER OF UNITS OF VOCATIONAL AGRICULTURE CREDIT SUBMITTED FOR COLLEGE ADMISSION

| Units of vocational agriculture | Number of students | Percent |
|---|---|---|
| 4 | 47 | 31.76 |
| 3 | 19 | 12.84 |
| 2 | 16 | 10.81 |
| 1 | 11 | 7.43 |
| 0 | 55 | 37.16 |
| Totals | 148 | 100.00 |

## COMPARISON OF STUDY GROUPS IN TERMS OF EARNED MEAN COLLEGE FRESHMAN GRADES AND MEAN CEEB SCORES

Mean college freshman grades earned by members of the vocational agriculture group and non-vocational agriculture group with recorded mean CEEB scores are shown in Table 3. The non-vocational agriculture group earned a mean college freshman grade of 74.78 as compared with 71.87 for the vocational agriculture group, a difference of 2.91 grade points. This difference, however, was not statistically significant.

It is interesting to note that the difference between the CEEB mean total scores of the vocational agriculture and of the non-vocational agriculture groups was significant with a probability of .02. The difference in CEEB mean verbal scores was highly significant with a probability of $<.01$. In each instance the difference favored the non-vocational agriculture group.

With CEEB scores held constant, it would appear that the vocational agriculture group did as well as the non-vocational agriculture group with reference to mean college freshman grades earned. In fact, with a significant difference at the .02 level between CEEB mean total scores and a difference between mean grades with a probability of .10, it would appear that the vocational agriculture group earned slightly better grades than would have been expected by using total CEEB scores as the predictor of mean college freshman grades.

## COMPARISON OF STUDY GROUPS IN TERMS OF GRADES EARNED ON SPECIFIC FRESHMAN COURSES

In view of questions often raised regarding the relative performance of groups of students in specific course areas, it was decided that a comparison of the two study groups should be made in terms of their performance in specific college courses. Course areas selected in which to make comparisons were botany, chemistry, English, mathematics, American history, economics, and

TABLE 3

STUDY GROUPS COMPARED ACCORDING TO MEAN FRESHMAN GRADES EARNED AND MEAN CEEB SCORES REPORTED

| Classification | Number of students | Mean grade | Mean verbal score | Mean math score | Total CEEB score |
|---|---|---|---|---|---|
| Without vocational agriculture | 55 | 74.78 | 348 | 399 | 747 |
| With vocational agriculture | 97 | 71.87 | 309 | 372 | 681 |
| Difference | | 2.91 | 39 | 27 | 66 |
| Calculated t value | | 1.858 | 2.690 | 1.884 | 2.359 |
| Probability | | <.10 | <.01 | <.10 | .02 |

zoology. In practice, it was found that the numbers of students reporting some of these courses were too small to permit statistical analysis. In these cases grades from two or more courses were combined to give a composite count for purposes of comparison.

The chi-square technique was used to test the significance of differences found to exist in the tendency noted between the members of the two groups to earn superior grades in specific course areas. Student grades were divided into three categories: "above C," "C," and "below C." An attempt was made to categorize groupings into A, B, C, D, and F classifications, but the results proved to be inaccurate because of the small numbers of grades reported in some classifications. Many of the grades for second courses within a course area sequence, e.g., Botany 121 and Botany 122, contained small numbers of grades and, therefore, grade differences were not computed for these particular courses. Whenever a composite of grades for the two courses within a course area was considered workable, however, this was done as a basis for making comparisons.

Botany

No significant difference was found between the grades earned by members of the two study groups in Botany 121 or between a composite of Botany 121 and Botany 122 grades. See Table 4. It was reported earlier that a significant difference was found between CEEB mean verbal scores as well as CEEB mean total scores of the two study groups in favor of the non-vocational group. This would tend to support the contention that students in the vocational agriculture groups earned better grades in freshman botany courses than they normally would have been expected to earn using CEEB scores as the predictor.

Chemistry

No significant difference was found between grades earned by members of the two study groups in Chemistry 121, in Chemistry 122, or in a composite of

TABLE 4

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTIONS IN BOTANY 121 AND COMPOSITE OF BOTANY 121 AND BOTANY 122

| | Botany 121 | | | | | | Botany 121 and 122 Composite | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Above C | 30 | 51.72 | 14 | 46.66 | 44 | 50.00 | 64 | 62.74 | 32 | 57.15 | 96 | 60.75 |
| C | 17 | 29.31 | 11 | 36.67 | 28 | 31.81 | 26 | 25.49 | 17 | 30.35 | 43 | 27.21 |
| Below C | 11 | 18.97 | 5 | 16.67 | 16 | 18.19 | 12 | 11.77 | 7 | 12.50 | 19 | 12.04 |
| Totals | 58 | 100.00 | 30 | 100.00 | 88 | 100.00 | 102 | 100.00 | 56 | 100.00 | 158 | 100.00 |

$X^2$ = .5627

Degrees of freedom = 2

Probability <.80

$X^2$ = .5640

Degrees of freedom = 2

Probability <.80

Chemistry 121 and Chemistry 122. See Tables 5 and 6. It should be noted again that there was a significant difference between the CEEB scores recorded by the two study groups, with the difference favoring the non-vocational agriculture group.

English

A significant difference at the $<.01$ level was found between grades earned by students in the two study groups in English 101. The difference favored the non-vocational group. See Table 7. Thus it appears that students in the vocational agriculture group made a significantly lower grade in English 101 than did students in the non-vocational agriculture group. If CEEB scores had been held constant, however, little, if any, difference between the English 101 grades earned by members of the two groups would have been found.

The difference between grades earned by the two study groups in English 102 was not statistically significant. A significant difference at the $<.01$ level of confidence, however, was also observed between the composite grades earned in English 101 and English 102 by the two study groups. See Table 8. The difference favored the non-vocational group. It is interesting to note that the difference in chi-square values between the study groups in grades earned in English 101 and English 102 decreased markedly.

These two observations make it appear that although students in the vocational agriculture group earned significantly lower grades in English courses than did students in the non-vocational agriculture group, the students in the former group also reported significantly lower CEEB mean verbal scores as well as CEEB mean total scores than did the non-vocational agriculture group. Again, should CEEB scores have been held constant, there would have been little, if any, difference in grades earned in freshman English courses.

TABLE 5

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTION IN CHEMISTRY 121 AND CHEMISTRY 122

| | Chemistry 121 | | | | | | Chemistry 122 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Above C | 13 | 23.22 | 11 | 31.42 | 24 | 26.37 | 7 | 28.00 | 4 | 14.29 | 11 | 20.75 |
| C | 25 | 44.64 | 16 | 45.71 | 41 | 45.06 | 10 | 40.00 | 8 | 28.51 | 18 | 33.96 |
| Below C | 18 | 32.14 | 8 | 22.85 | 26 | 28.57 | 8 | 32.00 | 16 | 57.14 | 24 | 45.29 |
| Totals | 56 | 100.00 | 35 | 100.00 | 91 | 100.00 | 25 | 100.00 | 28 | 100.00 | 53 | 100.00 |

$X^2 = 1.325$

Degrees of freedom = 2

Probability .50

$X^2 = 2.7141$

Degrees of freedom = 2

Probability <.30

TABLE 6

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTIONS IN A COMPOSITE OF CHEMISTRY 121 AND CHEMISTRY 122 GRADES

| | Composite of Chemistry 121 and 122 | | | | | |
|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent |
| Above C | 20 | 24.69 | 15 | 23.81 | 35 | 24.30 |
| C | 35 | 43.21 | 24 | 38.10 | 59 | 40.97 |
| Below C | 26 | 32.10 | 24 | 38.09 | 50 | 34.73 |
| Totals | 81 | 100.00 | 63 | 100.00 | 144 | 100.00 |

$X^2 = .5913$

Degrees of freedom = 2

Probability $< .80$

TABLE 7

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTIONS IN ENGLISH 101 AND ENGLISH 102

| | English 101 | | | | | | English 102 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Above C | 10 | 12.99 | 19 | 38.77 | 29 | 23.02 | 5 | 9.80 | 10 | 23.81 | 15 | 16.13 |
| C | 46 | 59.74 | 23 | 46.94 | 69 | 54.76 | 32 | 62.74 | 20 | 47.62 | 52 | 55.92 |
| Below C | 21 | 27.27 | 7 | 14.29 | 28 | 27.22 | 14 | 27.46 | 12 | 28.57 | 26 | 27.95 |
| Totals | 77 | 100.00 | 49 | 100.00 | 126 | 100.00 | 51 | 100.00 | 42 | 100.00 | 93 | 100.00 |

$X^2 = 11.7619$

Degrees of freedom = 2

Probability $<.01$

$X^2 = 3.7192$

Degrees of freedom = 2

Probability $<.20$

TABLE 8

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTIONS IN A COMPOSITE OF ENGLISH 101 AND ENGLISH 102

| | Composite of English 101 and 102 | | | | | |
|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent |
| Above C | 15 | 11.72 | 29 | 31.87 | 44 | 20.09 |
| C | 78 | 60.94 | 43 | 47.25 | 121 | 55.25 |
| Below C | 35 | 27.34 | 19 | 20.88 | 53 | 24.66 |
| Totals | 128 | 100.00 | 91 | 100.00 | 219 | 100.00 |

$X^2 = 14.1270$

Degrees of freedom = 2

Probability $< .01$

Mathematics

A significant difference at the <.01 level of confidence was found between grades received in Mathematics 102 by students in the two study groups. See Table 9. The same was found true with reference to a composite of Mathematics 102 and Mathematics 103 grades. The difference observed favored the non-vocational group. The vocational group made significantly lower grades in mathematics courses than did members of the non-vocational group. Again, if CEEB total scores had been held constant, it would appear that there would have been little, if any, difference between freshman mathematics grades earned by members of the two study groups.

Others

No statistically significant difference was found between a composite of grades earned in American history, economics, and zoology by the members of the two study groups. See Table 10. Because of the small number of students who enrolled in these courses, it was necessary to make a comparison of composite grades earned in these courses instead of making individual course comparisons.

No significant difference was found between composite grades received in all agricultural courses by members of the two study groups. See Table 11. Because of the small number of grades reported in certain of the categories studied, it was necessary in this instance to classify all grades as "C or above" and "below C."

No significant difference was found between composite grades earned on all common freshman courses reported by the members of the two study groups. See Table 12. The chi-square value computed neared, however, the .05 level of confidence. By interpolation the probability was .06. Thus the difference found approaches significance. It should be pointed out that the chi-square value of the difference found between the composite grades for common freshman

TABLE 9

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTIONS IN MATHEMATICS 102 AND A COMPOSITE OF MATHEMATICS 102 AND MATHEMATICS 103 GRADES

| | Math. 102 | | | | | | Composite of Math. 102 and 103 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Above C | 14 | 20.58 | 23 | 48.94 | 37 | 32.17 | 18 | 17.82 | 43 | 53.08 | 61 | 33.52 |
| C | 36 | 52.94 | 19 | 40.43 | 55 | 47.83 | 55 | 54.46 | 30 | 37.04 | 85 | 46.70 |
| Below C | 18 | 26.48 | 5 | 10.63 | 23 | 20.00 | 28 | 27.72 | 8 | 9.88 | 36 | 19.78 |
| Totals | 68 | 100.00 | 47 | 100.00 | 115 | 100.00 | 101 | 100.00 | 81 | 100.00 | 182 | 100.00 |

$X^2 = 11.3871$

Degrees of freedom = 2

Probability $< .01$

$X^2 = 26.8431$

Degrees of freedom = 2

Probability $< .01$

TABLE 10

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTIONS IN A COMPOSITE OF GRADES IN AMERICAN HISTORY, ECONOMICS, AND ZOOLOGY COURSES

| | American History, Economics, and Zoology Composite | | | | | |
|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent |
| Above C | 32 | 46.38 | 12 | 44.44 | 44 | 45.83 |
| C | 21 | 30.44 | 5 | 18.52 | 26 | 27.08 |
| Below C | 16 | 23.18 | 10 | 37.04 | 26 | 27.09 |
| Totals | 69 | 100.00 | 27 | 100.00 | 96 | 100.00 |

$X^2 = 2.0339$

Degrees of freedom = 2

Probability $<.70$

TABLE 11

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTIONS OF A COMPOSITE OF GRADES IN ALL AGRICULTURAL COURSES

| | Composite of Agricultural Courses | | | | | |
|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent |
| C or above | 34 | 75.56 | 7 | 58.33 | 41 | 71.93 |
| Below C | 11 | 24.44 | 5 | 41.67 | 16 | 28.07 |
| Totals | 45 | 100.00 | 12 | 100.00 | 57 | 100.00 |

$X^2 = 1.3326$

Degree of freedom = 1

Probability $<.30$

TABLE 12

STUDY GROUPS COMPARED IN TERMS OF GRADE DISTRIBUTIONS IN A COMPOSITE OF ALL COURSES MEASURED

| | Composite of All Courses Measured | | | | | |
|---|---|---|---|---|---|---|
| | With vocational agriculture | | Without vocational agriculture | | Total | |
| Grade | Number | Percent | Number | Percent | Number | Percent |
| Above C | 183 | 34.79 | 138 | 42.73 | 321 | 27.80 |
| C | 226 | 42.96 | 124 | 38.39 | 350 | 41.23 |
| Below C | 117 | 22.25 | 61 | 18.88 | 178 | 20.97 |
| Totals | 526 | 100.00 | 323 | 100.00 | 849 | 100.00 |

$X^2 = 5.8250$

Degrees of freedom = 2

Probability $< .10$

courses reported by members of the two study groups approximates the probability found between CEEB scores reported by members of the two groups. It would thus appear that the CEEB scores were a fair predictor of college success in terms of grades received in common freshman courses at Abraham Baldwin Agricultural College by the Freshman Class of 1960-61.

## COMPARISON OF STUDY GROUPS IN TERMS OF UNITS OF VOCATIONAL AGRICULTURE CREDIT IN RELATION TO MEAN FRESHMAN GRADES AND CEEB MEAN SCORES

### Group With No Vocational Agriculture Units vs. Groups With Varying Units of Vocational Agriculture

Comparisons in terms of CEEB scores were made between students reporting no vocational agriculture units and those reporting one, two, three, or four units of vocational agriculture credit. Also, various combinations of these units were studied in the same way. All comparisons were made by use of t values determined by sum of squares method for analysis of variance.

Significant differences at the $<.01$ level of confidence were found between CEEB mean total scores for students reporting no vocational agriculture units and those reporting two, three or four units of such credit. The difference favoring the non-vocational agriculture students is shown in Tables 13, 14, and 15. A significant difference at the $<.05$ level of confidence was found between CEEB mean total scores for students reporting no vocational agriculture units and those reporting one unit of vocational agriculture credit. See Table 16. The difference favored the non-vocational agriculture students.

No significant differences were found between the mean freshman college grades of students reporting no units and students reporting one, two, or four units of vocational agriculture credit. A significant difference at the $<.01$ level of confidence was found between mean freshman college grades of students reporting no units and those reporting three units of vocational agriculture

TABLE 13

STUDENTS REPORTING FOUR UNITS OF VOCATIONAL AGRICULTURE CREDIT COMPARED WITH THOSE REPORTING NO SUCH UNITS

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 4 | 47 | 73.06 | 303 | 382 | 685 |
| 0 | 55 | 74.78 | 348 | 399 | 747 |
| Differences | | 1.72 | 45 | 17 | 62 |
| Calculated t values | | 1.092 | 2.904 | 1.020 | 3.214 |
| Probability | | .30 | <.01 | .30 | <.01 |

TABLE 14

STUDENTS REPORTING THREE UNITS OF VOCATIONAL AGRICULTURE CREDIT COMPARED WITH THOSE REPORTING NO SUCH UNITS

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 3 | 19 | 68.53 | 292 | 355 | 647 |
| 0 | 55 | 74.78 | 348 | 399 | 747 |
| Differences | | 6.25 | 56 | 44 | 100 |
| Calculated t values | | 2.894 | 2.984 | 2.880 | 2.906 |
| Probability | | <.01 | <.01 | <.01 | <.01 |

TABLE 15

STUDENTS REPORTING TWO UNITS OF VOCATIONAL AGRICULTURE CREDIT COMPARED WITH THOSE REPORTING NO SUCH UNITS

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 2 | 16 | 70.69 | 313 | 381 | 694 |
| 0 | 55 | 74.78 | 348 | 399 | 747 |
| Differences | | 4.09 | 35 | 18 | 53 |
| Calculated t values | | 1.624 | 2.480 | .721 | 2.622 |
| Probability | | <.20 | <.02 | <.40 | <.01 |

TABLE 16

STUDENTS REPORTING ONE UNIT OF VOCATIONAL AGRICULTURE CREDIT COMPARED WITH THOSE REPORTING NO SUCH UNITS

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 1 | 11 | 72.91 | 359 | 341 | 700 |
| 0 | 55 | 74.78 | 348 | 399 | 747 |
| Differences | | 1.87 | 11 | 58 | 47 |
| Calculated t values | | .784 | .392 | 2.381 | 2.131 |
| Probability | | $<.50$ | .70 | .02 | $<.05$ |

credit. The difference favored the non-vocational agriculture group.

Significant differences at the<.01 level of confidence were found between the CEEB mean verbal scores of students reporting no units and those reporting three or four units of vocational agriculture credit with the difference favoring the non-vocational agriculture students. A significant difference at the<.02 level of confidence was found between CEEB mean verbal scores of students reporting no units and those reporting two units of vocational agriculture credit with the difference favoring the non-vocational agriculture students. No significant difference in CEEB verbal scores was found to exist between students reporting no units and those reporting one unit of vocational agriculture credit.

A significant difference at the<.01 level of confidence was found between CEEB mean mathematics scores of students reporting no units and those reporting three units of vocational agriculture with the difference favoring the non-vocational agriculture group. A significant difference at the<.02 level of confidence was found between CEEB mean mathematics scores for students reporting no units and those reporting one unit of vocational agriculture credit with the difference favoring the non-vocational agriculture group. No significant differences were found between CEEB mean mathematics scores for students reporting no units and those reporting two or four units of vocational agriculture credit.

In summary, even though the difference between CEEB mean total scores of the students reporting no units and those reporting one, two, or four units of vocational agriculture credit was significant, there was no significant difference between the groups in terms of mean freshman grades earned. In short, students reporting one, two, or four units of vocational agriculture seemingly earned higher mean freshman grades than they would have been expected

to earn using CEEB mean total scores as a predictor when compared with students reporting no units of such credit. The three-unit vocational agriculture group when compared to the non-vocational agriculture group earned practically the same mean freshman grades when CEEB scores were held constant.

Group With One Unit of Vocational Agriculture vs. Group With Two or More Units

No significant differences were found between CEEB mean total scores of students who reported one unit of vocational agriculture credit and those reporting two, three, or four units of such credit. See Tables 17, 18, and 19. No significant differences were found between freshman mean college grades of students who reported one unit of vocational agriculture credit and those who reported two, three, or four units of vocational agriculture credit.

No significant differences were found between CEEB mean mathematics scores of students reporting one unit of vocational agriculture credit and those reporting two, three, or four units of vocational agriculture credit. Significant differences at the $<.05$ level of confidence were found between CEEB mean verbal scores of students who reported one unit and students who reported three or four units of vocational agriculture credit. No significant difference was found between CEEB mean verbal scores of students who reported one unit and those who reported two units of vocational agriculture credit.

Group With Two Units of Vocational Agriculture vs. Group With Three or Four Units

No significant differences were found between either CEEB mean verbal or CEEB mean mathematics scores or mean freshman college grades of students reporting two units and those reporting three and four units of vocational agriculture credit. See Tables 20 and 21.

A significant difference at the $<.05$ level of confidence was found between CEEB mean total scores of students reporting two units and those reporting three units of vocational agriculture credit. The difference favored the two-

TABLE 17

A COMPARISON OF STUDENTS REPORTING ONE AND FOUR UNITS OF VOCATIONAL AGRICULTURE CREDIT

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 1 | 11 | 72.91 | 359 | 341 | 700 |
| 4 | 47 | 73.06 | 303 | 382 | 685 |
| Differences | | .15 | 56 | 41 | 15 |
| Calculated t values | | .126 | 2.102 | 1.707 | .391 |
| Probability | | <.90 | .05 | .10 | .60 |

TABLE 18

A COMPARISON OF STUDENTS REPORTING ONE AND THREE UNITS OF VOCATIONAL AGRICULTURE CREDIT

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 1 | 11 | 72.91 | 359 | 341 | 700 |
| 3 | 19 | 68.53 | 292 | 355 | 647 |
| Differences | | 4.38 | 67 | 14 | 53 |
| Calculated t values | | 1.5877 | 2.337 | .607 | .783 |
| Probability | | $<.20$ | $<.05$ | $<.60$ | $<.10$ |

TABLE 19

A COMPARISON OF STUDENTS REPORTING ONE AND TWO UNITS OF VOCATIONAL AGRICULTURE CREDIT

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 1 | 11 | 72.91 | 359 | 341 | 700 |
| 2 | 16 | 70.69 | 313 | 381 | 694 |
| Differences | | 2.22 | 46 | 40 | 6 |
| Calculated t values | | .728 | 1.778 | 1.317 | .403 |
| Probability | | <.50 | .10 | .20 | <.70 |

TABLE 20

A COMPARISON OF STUDENTS REPORTING TWO AND FOUR UNITS OF VOCATIONAL AGRICULTURE CREDIT

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 2 | 16 | 70.69 | 313 | 381 | 694 |
| 4 | 47 | 73.06 | 303 | 382 | 685 |
| Differences | | 2.37 | 10 | 1 | 9 |
| Calculated t values | | .960 | .902 | .121 | .736 |
| Probability | | <.40 | <.40 | <.90 | .50 |

TABLE 21

A COMPARISON OF STUDENTS REPORTING TWO AND THREE UNITS OF VOCATIONAL AGRICULTURE CREDIT

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 2 | 16 | 70.69 | 313 | 381 | 694 |
| 3 | 19 | 68.53 | 292 | 355 | 647 |
| Differences | | 2.16 | 21 | 26 | 47 |
| Calculated t values | | .751 | 1.370 | 1.096 | 2.036 |
| Probability | | <.50 | .20 | .30 | .05 |

unit group. No significant difference was found between CEEB mean total scores of students reporting two units and those reporting four units of vocational agriculture credit.

Group With Three Units of Vocational Agriculture vs. Group With Four Units of Vocational Agriculture

No significant differences were found between CEEB mean total, mean verbal, and mean mathematics scores of students reporting three units and those reporting four units of vocational agriculture credit. See Table 22. A significant difference at the .05 level of confidence was found between mean freshman college grades of students reporting three units and those reporting four units of vocational agriculture credit with the difference favoring the four-unit group of students.

Summary

Students with no units of vocational agriculture high school credit recorded significantly higher, at the<.01 level of confidence, CEEB mean total scores than did students reporting two, three, or four units of vocational agriculture. Students with no units also recorded significantly higher, at the<.05 level of confidence, CEEB mean total scores than did students reporting one unit of vocational agriculture credit.

No significant differences were found between mean freshman grades of students reporting no units and those reporting one, two, or four units of vocational agriculture credit. Students with no units of vocational agriculture credit recorded significantly higher, at the<.01 level of confidence, mean freshman grades than did students reporting three units of vocational agriculture credit. It would appear that students reporting varying units of vocational agriculture credit did as well in terms of mean freshman college grades as did those reporting no vocational agriculture units when CEEB total scores were held constant. In fact, the vocational agriculture group earned

TABLE 22

A COMPARISON OF STUDENTS REPORTING THREE AND FOUR UNITS OF VOCATIONAL AGRICULTURE CREDIT

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 3 | 19 | 68.53 | 292 | 355 | 647 |
| 4 | 47 | 73.06 | 303 | 382 | 685 |
| Differences | | 4.53 | 9 | 27 | 38 |
| Calculated t values | | 2.157 | .542 | 1.081 | 1.476 |
| Probability | | <.05 | .06 | .30 | <.20 |

somewhat better mean freshman grades than they would have been expected to earn by using CEEB total scores as the predictor. See Table 23. This seemed especially true of the students reporting one, two, or four units of vocational agriculture credit as shown in Table 24. Why students reporting three units of vocational agriculture credit behaved differently with regard to grades earned than did the one, two, or four unit group cannot be explained at this point.

## SUMMARY

This study was designed to compare the college performance of students who did and those who did not study vocational agriculture in Georgia high schools in terms of grades earned during the freshman year of study at Abraham Baldwin Agricultural College during the 1960-61 school year. The study population was limited to these students who had graduated from Georgia high schools, registered as freshman at the college in the fall of 1960, and completed the next three consecutive quarters of study there. Comparisons were made in terms of CEEB scores and mean college grades earned.

The significance of differences found was tested by use of chi-square or t values according to whether comparisons were made in terms of units of credit or mean grades and scores.

The following observations are based on the findings reported:

1. Ninety-three percent of all freshman male students enrolled at Abraham Baldwin Agricultural College for the three quarters of the school year, 1960-61, were graduates of Georgia high schools.

2. More than three-fifths of all freshman male members of this class reported some high school vocational agriculture units of credit for matriculation purposes.

3. Almost one-third of the members of the study group with vocational agriculture units reported as many as four units each of such credit.

TABLE 23

A COMPARISON OF THE PERFORMANCE OF STUDENTS REPORTING VARYING UNITS OF VOCATIONAL AGRICULTURE CREDIT IN TERMS OF MEAN GRADES EARNED AND CEEB SCORES

| Units of vocational agriculture | Number of students | Mean grade | Mean verbal score | Mean math. score | Total CEEB score |
|---|---|---|---|---|---|
| 4 | 47 | 73.06 | 303 | 382 | 685 |
| 3 | 19 | 68.53 | 292 | 355 | 647 |
| 2 | 16 | 70.69 | 313 | 381 | 694 |
| 1 | 11 | 72.91 | 359 | 341 | 700 |
| 0 | 55 | 74.78 | 348 | 399 | 747 |
| Total | 148 | | | | |

TABLE 24

STUDY GROUPS STRATIFIED ACCORDING TO NUMBER OF UNITS OF VOCATIONAL AGRICULTURE CREDIT AND COMPARED IN TERMS OF MEAN GRADES AND CEEB SCORES WITH PROBABILITY (DIFFERENCE CALCULATED BY t VALUES) SHOWN

| Units of vocational agriculture | Probability of Mean Grades, and CEEB Scores | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Units of vocational agriculture | | | | | | | | | | | | | | | |
| | 0 | | | | 1 | | | | 2 | | | | 3 | | | |
| | Grade | Verbal | Math. | Total | Grade | Verbal | Math. | Total | Grade | Verbal | Math. | Total | Grade | Verbal | Math. | Total |
| 1 | <.50 | .70 | <.02 | .05 | | | | | | | | | | | | |
| 2 | <.20 | <.05 | <.40 | .01 | <.50 | .10 | .20 | .70 | | | | | | | | |
| 3 | <.01 | <.01 | <.01 | .01 | <.20 | <.05 | <.60 | .10 | <.50 | .20 | .30 | .05 | | | | |
| 4 | .30 | <.01 | .30 | .01 | <.90 | <.05 | .10 | .60 | <.40 | <.40 | <.70 | .50 | <.05 | .60 | .30 | <.20 |

4. Members of the non-vocational agriculture group earned higher mean freshman grades than did the members of the vocational agriculture group, but the difference was not statistically significant.

5. The members of the non-vocational agriculture group recorded higher CEEB mean verbal scores than did the members of the vocational agriculture group. This difference was significant at the $<.01$ level of confidence.

6. The members of the non-vocational agriculture group recorded higher CEEB mean mathematics scores than did the members of the vocational agriculture group, but this difference was not statistically significant.

7. Members of the non-vocational agriculture group recorded higher CEEB mean total scores than did the members of the vocational agriculture group. The difference was significant at the $<.02$ level of confidence.

8. Differences between grades earned by the two study groups were not statistically significant in freshman courses of (1) botany, (2) chemistry, (3) English 102, (4) a composite of American history, economics, and zoology, (5) all agricultural courses, and (6) a composite of all courses. The group reporting the better grades varied from course to course.

9. Differences between grades earned in freshman courses of (1) English 101, (2) a composite of English 101 and 102, and (3) mathematics by members of the two study groups were statistically significant at the $<.01$ level and favored the non-vocational agriculture group.

10. When the non-vocational agriculture group was compared with the group reporting three units of vocational agriculture credit, the non-vocational agriculture group earned higher mean freshman grades but also recorded higher CEEB mean verbal scores, CEEB mean mathematics scores, and CEEB mean total scores. The difference in each instance between the two groups was statistically significant at the $<.01$ level of confidence.

11. When the non-vocational agricultural group was compared with the group composed of students reporting two or four units of vocational agriculture, the non-vocational agriculture group recorded higher CEEB mean total scores. The difference between the CEEB mean total scores of the two groups was significant at the $<.01$ level of confidence. The difference between the mean freshman grades earned by these two groups, on the other hand, was not statistically significant.

12. When the non-vocational agriculture group was compared with the group composed of those reporting one unit of vocational agriculture credit, the members of the non-vocational agriculture group recorded higher CEEB mean total scores. This difference was statistically significant at the $<.05$ level of confidence. There was no significant difference, however, between the mean freshman grades earned by the members of these two groups.

13. When students with one unit of vocational agriculture were compared with those reporting two, three, or four units of such credit, there was no significant difference between either the mean freshman grades earned or the CEEB mean total scores recorded.

14. When students reporting two units of vocational agriculture were compared with students reporting three or four units of such credit, there was no statistically significant difference between the two groups in terms of mean freshman grades, CEEB mean verbal scores, CEEB mean mathematics scores, or CEEB mean total scores.

15. When students reporting three units of vocational agriculture were compared with students reporting four units of vocational agriculture, the four-unit group earned higher mean freshman grades, and this difference was significant at the $<.05$ level. The differences between these groups in terms of CEEB mean verbal scores, CEEB mean mathematics scores, and CEEB mean total scores were not statistically significant. It should be pointed out, however, that the difference between the CEEB mean verbal scores of these two groups closely approached significance with a probability of .06.